CHAPTER 2. AIRLINE TRANSPORT PILOT CERTIFICATES

SECTION 3. CONDUCT OF FLIGHT TESTS IN AIRPLANE FLIGHT SIMULATORS AND TRAINING DEVICES

105. ACCEPTABLE METHODS FOR ACCOMPLISHING AN AIRPLANE FLIGHT TEST. There are three acceptable methods for accomplishing an airplane flight test. Flight tests may always be conducted entirely in an airplane. Under certain circumstances, flight tests may be conducted entirely in an advanced flight simulator. Flight tests may also be conducted in two segments in which certain specific events may be tested in a flight training device (FTD) or flight simulator, while other events must be tested in an airplane. The method used depends on the level of approval of the FTD or flight simulator and on the status of the applicant. Explanations of these methods are as follows:

A. Level D Flight Simulators (Previously referred to as Phase Three flight simulators): All pilots employed by an operator, regardless of training category, are eligible for the entire flight test in a level D flight simulator without a subsequent airplane segment.

B. Level C Flight Simulators (Previously referred to as Phase Two flight simulators): The method that may be used depends on the training status of the applicant.

(1) Transition Training Applicants: For those applicants who have completed transition training, the entire flight test may be conducted in either a level C or D flight simulator.

(2) Upgrade Training Applicants: Those applicants who have completed upgrade training and who meet the criteria of either 105B(2)(a) or (b) are eligible to complete the entire flight test in a level C flight simulator. When an upgrade applicant does not meet these criteria, the combination of a flight simulator and airplane flight test is required.

(a) The applicant must have been previously qualified as second-in-command (SIC) in the airplane type. The applicant must have acquired 500 hours as an SIC for that operator in the same group of airplanes. The applicant must be currently serving as an SIC for that operator in the same group of airplanes.

(b) The applicant must be currently serving as an SIC with that operator in an airplane of the same group. The applicant must have a minimum of 2,500 flight hours as an SIC in airplanes of the same group with that operator. The applicant must have served as SIC on at least two airplanes of the same group with that operator.

(3) Initial Equipment Training Applicants. Federal Aviation Regulations (FAR) Part 121, Appendix H, permits SIC's that are being trained as pilot-in-command (PIC) in an initial equipment curriculum and who meet the qualifications specified by subparagraph 105B(2)(b), to complete training and be tested in a level C flight simulator. All other applicants must be trained and tested on specific events in an airplane.

(4) Initial New-Hire Training Applicants. All applicants that are being trained in an initial new-hire curriculum using a level C flight simulator must be trained and tested in specific events in an airplane.

NOTE: Line-oriented flight training (LOFT) is required for all applicants that are to be tested entirely in a level C or D flight simulator.

C. Levels A and B Flight Simulators (Previously referred to as visual and Phase One simulators, respectively): When a level A or level B flight simulator is used for a flight test, all events may be evaluated in the flight simulator. However, the evaluation of certain specified events in a subsequent airplane flight test segment is required for all applicants.

D. Level 7 and Lower Flight Training Devices. When a level 7 or lower FTD is used for a flight test, all applicants are required to take a subsequent airplane flight test segment. If training on a particular event may be accomplished in a training device, flight testing of that event may also be conducted in that device. Before beginning a flight test in a level 7 or lower training device, inspectors or examiners must determine which events have been approved for the specific device.

107. SELECTION OF FLIGHT TEST JOB AIDS. Job aids have been prepared to assist inspec-

tors and examiners in accomplishing the specific requirements of the three methods for conducting flight tests.

A. Single-Segment Flight Tests. When a flight test is conducted entirely in an airplane or entirely in a flight simulator, inspectors and examiners should use the "ATP/Type Rating Single-Segment Flight Test Job Aid—Flight Simulator or Airplane" (see figure 5.2.3.1.).

B. Two-Segment Flight Tests. When a flight test is conducted in two segments (the first segment in a level A flight simulator or any higher level of flight simulator and the second segment in an airplane), there is a standard set of events that must be evaluated on the airplane segment. All remaining events are usually evaluated in the flight simulator segment. If an event normally evaluated in the flight simulator segment is not accomplished in that segment, it must subsequently be evaluated in the airplane segment. The events are listed on the "ATP/Type Rating Two-Segment Flight Test Job Aid—Flight Simulator and Airplane" (see figure 5.2.3.2.).

C. Level 7 or Lower Flight Training Devices. When a flight test is conducted in two segments, the first segment in a level 7 or lower FTD and the second segment in an airplane, inspectors and examiners should use the "ATP/Type Rating Two-Segment Flight Test Job Aid—Flight Training Device and Airplane" (see figure 5.2.3.3.).

109. PLANNING A FLIGHT SIMULATOR OR TRAINING DEVICE FLIGHT TEST SEGMENT. The most important factor in conducting an efficient and effective flight test is proper planning. Principal operations inspectors (POI) shall develop briefing guides for inspectors and examiners to use in planning flight tests. The events that may be accomplished in each device should be specified in the briefing guide. Also specified should be the takeoff and landing minimums the operator is authorized to use and whether training has been conducted on circling approaches. If Category (CAT) II or CAT III operations are authorized, the additional approaches required for pilot qualification in those operations should be specified. The following recommended planning sequence is presented for guidance to inspectors and examiners.

A. Determine the Method of the Flight Test. Whether a flight test may be conducted entirely in a flight simulator depends on the level of the flight simulator to be used and the category of training that the applicant has completed. If the applicant or simulator does not qualify for the complete test to be conducted in a flight simulator, the flight test must be conducted in two segments. The first segment must be conducted in a flight simulator or FTD and the second in an airplane (see paragraph 105).

B. Select the Appropriate Job Aid. A job aid has been prepared for each acceptable method of conducting a flight test (see paragraph 107). Job aids are available on the district office Job Aid Disk (see examples of job aids at the end of this section).

C. Determine Flight Simulator and Training Device Capabilities. Inspectors and examiners should familiarize themselves with capabilities of the specific flight simulator or training device to be used.

(1) Inspectors and examiners should determine what airport visual models the particular simulator is capable of generating.

(2) Inspectors and examiners should review the approaches and departures that are available at these airports. It may be necessary and desirable for inspectors or examiners to conduct the flight test at multiple airports.

(3) The problems and malfunctions to be programmed into the flight simulator should be planned before beginning the flight test.

D. Review Operations Specifications Authorizations. Inspectors shall acquaint themselves with the operator's operations specifications to determine the following:

- The types of authorized approaches
- The authorized minimums for takeoffs and landings
- Any authorized special operations

E. Determine CAT II or CAT III Approach Requirements. If CAT II or CAT III procedures are to be evaluated in conjunction with the certification, the inspector or examiner must coordinate with the POI or aircrew program manager (APM) and determine the number and type of additional approaches that must be evaluated.

F. Review the Operator's Manual. The inspector shall become acquainted with the operator's aircraft operating manual, particularly the sections on authorized minimums, flight maneuvers, crew coordination, and procedures.

G. Plan a Scenario. From the information learned in the previous steps, inspectors or examiners should be able to plan a scenario that permits efficient use of time. The scenario should present test events in a realistic sequence. The environmental conditions in which the events are presented must be planned before the flight test. It is recommended that inspectors and examiners use the job aid when planning the

flight test. For example, the sequence for which events will be presented may be numbered in the blocks provided. When planning flight tests, the events and the environmental conditions should be varied from one flight test to another flight test. This variety ensures that applicants are presented with new problems and that the flight testing includes a sampling of the operator's entire pilot training program over a period of time.

H. Determine Simulator Operation. Either the inspector or an operator's employee may operate the simulator's control panel during the flight test. Before an inspector operates a flight simulator or training device control panel, that inspector must receive instruction and a clearance from an authorized representative of the operator. When an operator's employee operates the simulator control panel, that employee must be briefed on the sequence of events and signals to be used during the flight test. The inspector shall not delegate the flight test planning function to an operator's employee but must plan the sequencing of events and the conditions under which events are to be conducted. The inspector should act as the air traffic control (ATC) controller and issue all clearances.

111. APPLICANT BRIEFING. Before beginning the flight test, the inspector or examiner shall brief an applicant on how the flight test is to be conducted and what is to be required of the applicant on the flight test. A briefing outline is included on applicable job aids. Inspectors and examiners are encouraged to develop their own expanded, individual supplements to the outline on the job aid.

113. SUPPORTING CREWMEMBERS. All crew positions required by the approved flight manual (AFM) must be occupied by qualified personnel during flight tests that are conducted in a flight simulator or training device. It is recommended that the supporting crewmember not be an applicant for a certificate or rating. These individuals do not have to be current. The inspector or examiner shall not occupy a crew position during a flight test conducted in a flight simulator or training device.

A. Inspectors and examiners shall brief supporting crewmembers that they are to perform their duties as specified by the operator's aircraft operating manual. Supporting crewmembers must provide normal crew coordination support; however, they shall not be permitted to lead the applicant when the applicant is expected to take the initiative.

B. The applicant's ability to compute takeoff and approach data is evaluated on the oral test. Unless data computation is specifically the PIC's duty, it is not required during the flight test segment. Inspectors and examiners should coordinate with a supporting crewmember to provide the data required during the flight test.

115. CONDUCTING A FLIGHT TEST IN A FLIGHT SIMULATOR OR TRAINING DEVICE. Conducting a flight test in a flight simulator or training device is a skill requiring study and practice. Inspectors and examiners must endeavor to conduct flight tests in a manner that reproduces actual flight conditions as accurately as possible. Prior planning is an essential element. See paragraph 109.

A. Inspectors and examiners should avoid asking unnecessary questions, making comments, and shall discourage conversations not specifically concerning the conduct of the flight test. Inspectors and examiners should take notes during the flight test for use during debriefing.

B. When possible, the inspector or examiner should program the initial flight test parameters into the flight simulator before an applicant arrives. When this is not possible, the inspector or examiner should arrange to have someone else program the parameters into the flight simulator. The inspector's or examiner's attention should be focused on the actions of the applicant and crew during the cockpit preparation phase of the flight test.

C. Inspectors and examiners shall use correct ATC terminology. Clearances should be issued as they would be issued in actual flight.

D. Inspectors and examiners should usually avoid use of the repositioning and freeze features of the flight simulator during the flight test to ensure realism and to avoid disorienting the applicant.

E. The flight test must be paced so that the applicant is not rushed. Events should be presented in an orderly and efficient manner. Inspectors and examiners who regularly conduct flight tests usually require less time to conduct an adequate flight test than less experienced inspectors and examiners. Experience has shown that proficient inspectors and examiners can conduct a complete airline transport pilot (ATP) or type rating simulator flight test in a multiengine, transport category airplane in approximately 2 hours. A flight test lasting more than 2 1/2 hours (assuming no flight simulator malfunctions) may indicate poor performance on the part of the applicant or poor technique on the part of the inspector or examiner.

(1) Waiving events can reduce the time; however, events shall not be waived for the purpose of completing a flight test within a time schedule. It is

not an acceptable practice for an operator to place a maximum on the time allotted for a certification flight test.

(2) Inspectors and examiners are required to evaluate those normal, abnormal, and emergency procedures that are published in the operator's aircraft operating manual but which are not explicitly specified as flight test events in FAR Part 61, Appendix A. It is not practical or necessary to evaluate the applicant in every event in which the applicant has received training. Two or three of these events is a reasonable number per flight test and should accomplish the purpose of ensuring that the applicant is proficient throughout the range of events in which training was conducted. The flight test is a test of proficiency and not of endurance. The inspector or examiner should not extend a flight test when the applicant's proficiency is in question. If the inspector or examiner is not convinced of the applicant's basic proficiency from observing the required events, the applicant's level of proficiency is usually not acceptable.

F. When a flight simulator malfunctions, it may appear to the applicant to be a problem with an aircraft system. When this or any other problem occurs, the applicant should not assume that the problem is a flight simulator malfunction, but should deal with it as though it has been encountered in an airplane. If a malfunction affects handling qualities, the flight test should be suspended until maintenance can be conducted. Inspectors and examiners must exercise judgment in such cases. It is undesirable to cause unnecessary delays, but it is unacceptable to conduct a flight test in a flight simulator that does not accurately represent the airplane's handling qualities. When the flight simulator's handling quality is in doubt, it is appropriate for the inspector or examiner to fly the flight simulator to assess the state of its handling qualities.

G. Occasionally, a flight test will be delayed or interrupted due to malfunctions or power failures. When such interruptions occur, the inspector or examiner should be aware of the nervous and fatigue state of the applicant. In fairness to the applicant, it may become necessary for the inspector or examiner to reschedule the remaining portion of the flight test segment.

117. DEBRIEFING. The inspector or examiner shall inform the applicant of the results of the flight test segment during the debriefing. See subparagraph 33F.

118. - 122. RESERVED.

FIGURE 5.2.3.1.
ATP/TYPE RATING SINGLE-SEGMENT FLIGHT TEST JOB AID
FLIGHT SIMULATOR OR AIRPLANE

GROUND OPERATIONS	
Preflight Inspection	[ ]
Taxiing or Sailing	[ ]
Powerplant Checks	[ ]
TAKEOFFS	
Normal	[ ]
Instrument	[ ]
Crosswind	[ ]
With Powerplant Failure	[ ]
Rejected Takeoff	[ ]
INSTRUMENT PROCEDURES	
Area Departure	[ ]* 1, but not both,
Area Arrival	[ ]* may be waived
Holding	[ ]*
Normal Instrument Landing System (ILS) Approach	[ ] With F/D
Autopilot Coupled ILS	[ ] If equipped
Engine-Out ILS	[ ]
Nonprecision Approach	[ ]
Second Nonprecision Approach	[ ]* If done
Circling Approach (Not required if the operator does not train for the event.)	[ ] in training
Missed Approach from an ILS	[ ]
Engine-Out Missed Approach	[ ]
IN-FLIGHT MANEUVERS	
Steep Turns	[ ]*
Approaches to Stalls	[ ]* 2 may be waived
Specific Flight Characteristics	[ ]* If required
Powerplant Failure	[ ]
VISUAL APPROACHES	
No-Flap/Partial-Flap Approach	[ ] If required
With 50 % Powerplants Inoperative	[ ]
LANDINGS	
(Landings may be combined - minimum of 3 required)	
Normal Landing	[ ]
Landing from an ILS	[ ]
Crosswind Landing	[ ]
Landing with 50 % Powerplants Inoperative	[ ]
From Circling Approach	[ ] If required
Rejected Landing	[ ]
Accuracy Landings, single-engine only (3)	[ ] If no commercial

Events annotated with * may be waived, if appropriate conditions are met.

FIGURE 5.2.3.1.—Continued
ATP/TYPE RATING SINGLE-SEGMENT FLIGHT TEST JOB AID
FLIGHT SIMULATOR OR AIRPLANE

NORMAL, ABNORMAL, AND EMERGENCY PROCEDURES—SAMPLE

[ ] Anti-Icing and Deicing; Hydraulic, Electrical, Pneumatic, and Other Systems Failures; Gear, Flaps, Control Systems; Navigation and Communications Equipment; Fire in Flight, Smoke Control; Decompression, Emergency Descent, Emergency Landing, and Evacuation.

NOTE: Inspectors should refer to the appropriate section of "Airline Transport Pilot and Type Rating Practical Test Standards" (FAA-S-8081-5), as amended, for maneuver tolerances.

BRIEFINGS

[ ] A. Brief Applicant:
1. Departure point, destination, route, weather,
2. Aircraft weight and fuel load
3. Role of inspector
4. Use of crewmembers and autopilot (Applicant is in command and must perform command duties successfully.)
5. Review minimums to be used on test

[ ] B. Brief Supporting Crewmembers:
1. Crew will perform normal duties of their positions
2. Will act in support role and not initiate - may be asked to delete calls, altitude alerts, etc.
3. Duties of safety pilot

[ ] C. Safety Pilot Briefing:
1. Touch-and-go procedures
2. Use of hood
3. Transfer of controls
4. Simulated emergencies
5. Response to an actual emergency
6. V_1 cut
7. Other specific events

FIGURE 5.2.3.2.
ATP/TYPE RATING TWO-SEGMENT FLIGHT TEST JOB AID
FLIGHT SIMULATOR OR AIRPLANE

APPLICANT NAME: _____

	SIMULATOR	AIRPLANE
INSPECTOR OR EXAMINER NAME:	_____	_____
OFFICE:	_____	_____
DATE:	_____	_____

Events annotated with * may be waived, if appropriate conditions are met. Indicate those events not evaluated in the simulator with an "NE" in the [ ] for the event.

GROUND OPERATIONS	**SIMULATOR**	**AIRPLANE**
Preflight Inspection	[ ]<cockpit	[ ]*<exterior
Taxiing or Sailing		[ ]
Powerplant Checks	[ ]	
TAKEOFFS		
Normal		[ ]
Instrument	[ ]	
Crosswind	[ ]	[ ]
With Powerplant Failure	[ ]	
Rejected Takeoff	[ ]	
INSTRUMENT PROCEDURES		
Area Departure	[ ]* 1, but not both,	
Area Arrival	[ ]* may be waived	
Holding	[ ]*	
Normal Instrument Landing System (ILS) Approach	[ ] With F/D	
Autopilot Coupled ILS	[ ] If equipped	
Engine-Out ILS	[ ]	
Nonprecision Approach	[ ]	
Second Nonprecision Approach	[ ]* If done in training	
Circling Approach (Not required if the operator does not train for the event.)	[ ]	
Missed Approach from an ILS	[ ]	
Engine-Out Missed Approach	[ ]	
Missed Approach in Airplane		[ ]
IN-FLIGHT MANEUVERS		
Steep Turns	[ ]*	
Approaches to Stalls	[ ]* 2 may be waived	
Specific Flight Characteristics	[ ]* If required by FSB	
Powerplant Failure	[ ]	
VISUAL APPROACHES		
No-Flap	[ ] If required	
With 2 Engines Inoperative	[ ] 3- & 4-engine airplanes	

FIGURE 5.2.3.2.—Continued
ATP/TYPE RATING TWO-SEGMENT FLIGHT TEST JOB AID
FLIGHT SIMULATOR OR AIRPLANE

LANDINGS	SIMULATOR	AIRPLANE
Normal Landing		[ ]
Landing from an ILS	[ ]	
Crosswind Landing	[ ]	[ ]
Landing with 2 Engines Inoperative	[ ]3- & 4-engine airplanes	
Engine-Out Landing		[ ]
From Circling Approach	[ ]	[ ] If required
Rejected Landing	[ ]	
Accuracy Landings (3) Single Engine only		[ ] If no commercial

NOTE: Landings may be combined. A minimum of 3 must be accomplished in the airplane; however, if the landing from an ILS is completed in the simulator, only two landings need to be accomplished in the airplane.

NORMAL, ABNORMAL, AND EMERGENCY PROCEDURES—SAMPLE

[ ] Anti-Icing and Deicing; Hydraulic, Electrical, Pneumatic, and Other Systems Failures; Gear, Flaps, Control Systems; Navigation and Communications Equipment; Fire in Flight, Smoke Control; Decompression, Emergency Descent, Emergency Landing, and Evacuation.

NOTE: Inspectors should refer to the appropriate section of "Airline Transport Pilot and Type Rating Practical Test Standards" (FAA-S-8081-5), as amended, for maneuver tolerances.

BRIEFINGS

[ ] A. Brief Applicant:
1. Departure point, destination, route, weather
2. Aircraft weight and fuel load
3. Role of inspector
4. Use of crewmembers and autopilot (Applicant is in command and must perform command duties successfully.)
5. Review minimums to be used on test

[ ] B. Brief Supporting Crewmembers:
1. Crew will perform normal duties of their positions
2. Will act in support role and not initiate - may be asked to delete calls, altitude alerts, etc.
3. Duties of safety pilot

[ ] C. Safety Pilot Briefing:
1. Touch-and-go procedures
2. Use of hood
3. Transfer of controls
4. Simulated emergencies
5. Response to an actual emergency
6. V_1 cut
7. Other specific events

FIGURE 5.2.3.3.
ATP/TYPE RATING TWO-SEGMENT FLIGHT TEST JOB AID
FLIGHT TRAINING DEVICE AND AIRPLANE

APPLICANT NAME: _____

	TRAINING DEVICE	AIRPLANE
INSPECTOR OR EXAMINER NAME:	_____	_____
OFFICE:	_____	_____
DATE:	_____	_____

Events annotated with * may be waived, if appropriate conditions are met. Indicate those events not evaluated in the simulator with an "NE" in the [ ] for the event.

	SIMULATOR	AIRPLANE
GROUND OPERATIONS		
Preflight Inspection	[ ]<cockpit	[ ]*<exterior
Taxiing or Sailing		[ ]
Powerplant Checks	[ ]	[ ]
TAKEOFFS		
Normal		[ ]
Instrument		[ ]
Crosswind		[ ]
With Powerplant Failure		[ ]
Rejected Takeoff		[ ]
INSTRUMENT PROCEDURES		
Area Departure	[ ]*	[ ]*One, but not both,
Area Arrival	[ ]*	[ ]*may be waived
Holding	[ ]*	[ ]*
Normal Instrument Landing System (ILS) Approach		[ ] With F/D
Autopilot Coupled ILS	[ ]	[ ] If equipped
Engine-Out ILS	[ ]	[ ]
Nonprecision Approach	[ ]	[ ]
Second Nonprecision Approach	[ ]*	[ ]* If done in training
Circling Approach (Not required if the operator does not train for the event.)	[ ]	
Missed Approach from an ILS	[ ]	[ ]
Engine-Out Missed Approach	[ ]	[ ]
Missed Approach in Airplane		[ ]
IN-FLIGHT MANEUVERS		
Steep Turns	[ ]*	[ ]*
Approaches to Stalls	[ ]*	[ ]* 2 may be waived
Specific Flight Characteristics	[ ]*	[ ]* If required by FSB
Powerplant Failure	[ ]	
VISUAL APPROACHES		
No-Flap		[ ] If required
With 2 Engines Inoperative		[ ] 3- & 4-engine airplanes

FIGURE 5.2.3.3.—Continued
ATP/TYPE RATING TWO-SEGMENT FLIGHT TEST JOB AID
FLIGHT TRAINING DEVICE AND AIRPLANE

LANDINGS	AIRPLANE
Normal Landing	[ ]
Landing from an ILS	[ ]
Crosswind Landing	[ ]
Landing with 50% Powerplants Inoperative	[ ]
From Circling Approach	[ ] If required
Rejected Landing	[ ]
Accuracy Landings (3) Single Engine Only	[ ] If no commercial

NOTE: Landings may be combined; however, a minimum of 3 must be accomplished.

NORMAL, ABNORMAL, AND EMERGENCY PROCEDURES - SAMPLE

[ ] Anti-icing and Deicing; Hydraulic, Electrical, Pneumatic, and Other Systems Failures; Gear, Flap, Control Systems; Navigation and Communications equipment; Fire in Flight, Smoke Control; Decompression, Emergency Descent, Emergency Landing, and Evacuation.

NOTE: Inspectors should refer to the appropriate section of ''Airline Transport Pilot and Type Rating Practical Test Standards'' (FAA-S-8081-5), as amended, for maneuver tolerances.

BRIEFINGS

[ ] A. Brief Applicant:
1. Departure point, destination, route, weather
2. Aircraft weight and fuel load
3. Role of inspector
4. Use of crewmembers and autopilot (Applicant is in command and must perform command duties successfully.)
5. Review minimums to be used on test

[ ] B. Brief Supporting Crewmembers:
1. Crew will perform normal duties of their positions
2. Will act in support role and not initiate - may be asked to delete calls, altitude alerts, etc.
3. Duties of safety pilot

[ ] C. Safety Pilot Briefing:
1. Touch-and-go procedures
2. Use of hood
3. Transfer of controls
4. Simulated emergencies
5. Response to an actual emergency
6. V_1 cut
7. Other specific events

[PAGES 5-79 THROUGH 5-86 RESERVED]